R E P O R T R E S U M E S

ED 013 886 VT 000 835

A STUDY TO DETERMINE THE NEED AND TYPE OF TRAINING PROGRAM FOR AGRICULTURAL PUBLIC SERVICE TECHNICIANS.

MOUNT SAN ANTONIO COLL., WALNUT, CALIF.

PUB DATE 63

EDRS PRICE MF-$0.25 HC-$0.60 15P.

DESCRIPTORS- *TECHNICAL EDUCATION, *AGRICULTURAL EDUCATION, JUNIOR COLLEGES, OPINIONS, EMPLOYERS, *EDUCATIONAL NEEDS, OCCUPATIONAL SURVEYS, GOVERNMENT (ADMINISTRATIVE BODY), *AGRICULTURAL TECHNICIANS, *EMPLOYMENT OPPORTUNITIES, CURRICULUM, EQUIPMENT, MT. SAN ANTONIO COLLEGE, CALIFORNIA,

THE OBJECTIVE WAS TO STUDY AGRICULTURAL PUBLIC SERVICE TECHNICIANS IN THE STATE TO DETERMINE (1) THE NUMBER EMPLOYED BY FEDERAL, STATE, AND LOCAL AGENCIES, (2) EXISTING SHORTAGES, (3) THE TYPE OF TRAINING NEEDED, (4) DESIRABILITY OF TRAINING PROGRAM AT MT. SAN ANTONIO COLLEGE, (5) EQUIPMENT AND PROGRAMS NEEDED, AND (6) EQUIPMENT NEEDED IN A PROPOSED BUILDING. INFORMATION WAS GATHERED BY INTERVIEWS AND MEETINGS WITH FEDERAL, STATE, AND LOCAL AGENCY DEPARTMENT HEADS AND EMPLOYED TECHNICIANS. OVER 51 DIFFERENT KINDS OF JOBS EXISTED FOR TECHNICIANS WITH 2 YEARS OF TRAINING. OVER 400 PERSONS WERE EMPLOYED IN THESE JOBS. EMPLOYERS RECOMMENDED INSTRUCTION IN FERTILIZERS, PESTICIDES, INSECTICIDES, CHEMISTRY, STANDARDIZATION, VERTEBRATE PESTS, SOILS, BOTANY, WEEDS, TRUCK CROPS, AND AGRONOMY. IN ADDITION TO COURSES SUCH AS ENGLISH, HISTORY, AND MATHEMATICS, THE EMPLOYERS STRESSED HUMAN RELATIONS. NEED WAS INDICATED FOR BASIC TECHNICIAN PROGRAMS ORIENTED TOWARD ANIMAL SCIENCE, PLANT SCIENCE, AND AGRICULTURAL ENGINEERING. (JM)

ED013886

TECHNICIANS
IN
AGRICULTURE

VT000835

MT. SAN ANTONIO COLLEGE
Walnut, California

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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A STUDY TO DETERMINE THE NEED AND TYPE OF TRAINING PROGRAM FOR AGRICULTURAL PUBLIC SERVICE TECHNICIANS

Prepared Under the Provisions of Title VIII
of the National Defense Education Act in
Cooperation With the Bureau of Agricultural
Education and the State Department of
Education in California

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PREFACE

For the casual observer it may be difficult to see the dynamic changes that have taken place in agricultural technology during the past few years. To most people these changes have not been as spectacular as those in the space field or other areas. In many cases these advances in agricultural technology have been overshadowed by farm surpluses and the adverse publicity accompanying them. Nevertheless, changes have been and are taking place at a rapid pace in agriculture.

Changes in agriculture have affected people, jobs, and farming methods, and have led to many off-the-farm activities that are an integral part of agriculture.

These changes have caused those in agricultural education to become aware of the emergence of a whole new era of responsibility — that of training young people in agriculture for more than the occupation of farming.

An adequate, high quality food supply is vital to national defense. The National Defense Education Act of 1958 made provisions for studying the training or retraining of youth or adults in the technical fields vital to National Defense. This study was conducted under the provisions of Title VIII.

It is impossible to list all of the individuals who helped with the study, but appreciation is extended to the United States Department of Agriculture, the County Agricultural Commissioners, and others who helped furnish the information for study.

The Agricultural Advisory Committee of Mt. San Antonio College provided valuable guidance and assistance in the study, and appreciation is extended to these men:

Bernard Brownstein, Chairman	Ken Johnson
Alfred E. Benton	Truman Johnson
Dr. F. M. Brennan	Dr. H. H. Lasky
O. G. Brickbauer	Maurice Peairs
Art Christie	Leonard Scott
Allan Corrin	L. J. Scritsmier
Elvin Embly	Willard Smith
Howard Hawkins	Kermit Wilson

In addition to Mr. Thomas J. O'Connor from the administration, appreciation is extended to Dr. Oscar H. Edinger, President, and Mrs. Marie T. Mills, Assistant Superintendent of Mt. San Antonio College for their interest in the development of a modern agricultural program.

Appreciation is extended to the members of the Bureau of Agricultural Education of the State Department of Education for their fine guidance and suggestions for the study.

Mr. B. J. McMahon, Chief

Mr. E. D. Graf, Assistant Chief

Mr. Kenneth Cutler, Regional Supervisor

A STUDY TO DETERMINE THE NEED AND TYPE OF TRAINING PROGRAM FOR AGRICULTURAL PUBLIC SERVICE TECHNICIANS

Purpose of the Study

The purpose of the project was to make a study of agricultural public service technicians in California to determine:

1. Number employed by the United States Department of Agriculture, state, various counties, and local agencies;
2. Whether a shortage of trained personnel exists in this field;
3. Type of training needed in these occupations;
4. Whether a training program would be desirable at Mt. San Antonio College;
5. Type of program and equipment needed to offer this training;
6. Whether a proposed new building for agriculture should include additional types of teaching equipment.

Definition of Technician

For the purposes of this study, the technician is one who is called upon to make mental judgments or decisions and who also may need to do manipulative skills in the course of his employment. Occupationally this places the technician on a level above the skilled worker and below the professional worker, such as a scientist or an engineer. During the course of his work the technician may be called upon to do tasks involving both of these areas. With this definition in mind, it is assumed that the technician will need specialized training beyond the high school level but less than that leading to a B.S. Degree.

The Agricultural Public Service Technician is one who is qualified to provide technical service to federal, state, county, municipal, commercial, and private agencies or firms. His activities include control, standardization, inspection, grading, certification, and quarantine of agricultural products. In addition, his work includes analysis, regulation, and enforcement of agricultural programs.

Limitations of the Study

Due to the broad scope of agriculture as an occupational area, no attempt was made to include all types of technicians. As the study progressed, however, it became apparent that other types of technicians were needed in agriculture. Many of these will require a similar type of training to that which is required for the public service technician. It is therefore possible that the training program as set up for the public service technician may also be used for other areas. It would be a major task to establish individual programs for all types of technicians.

Need for the Study

Mt. San Antonio College is located in a suburban area where farming has been decreasing. As a result, the number of graduates going into farming has been decreasing. At the same time, however, there has been a corresponding increase in demand for young people trained in related agricultural fields. The food processing industry in California, for example, is a billion dollar industry.

It requires many people trained as inspectors, buyers, and for positions in quality control work. Therefore, it seemed desirable to explore these areas of work to identify the jobs, the training needed, and the type of equipment to do this training.

In a study made by Robert S. McGlothlin of the Stanford Research Institute in 1960, he points out the changes in relationship between the production segment (farming) and the nonproduction segment (farm business, etc) in the United States. From 1910 to 1954 the growth (value added) of the farm production segment tripled in amount but dropped, proportionately, from a little more than one-half of the industry total to slightly under one-fifth. Conversely, the value added by the non-farm segment of agriculture increased fifteen times in amount and rose to a little over four-fifths of the industry total. There is little indication that this trend will change in the next several years. The decline in the number of people involved in the farming segment has been almost exactly balanced by a rise in the non-farm segment. Due to a decline in enrollments in agricultural colleges during the past twenty years, the colleges are falling short of supplying the needed graduates in these related areas. By 1970, it is estimated that only one in five of the people needed in industry will come from the agricultural colleges.

As a result of this shortage and competition from other industries, competition in the job market has already become keen. Students are able to be particular about which job they choose. It is reasonable to expect that some jobs with lower starting salaries will become increasingly difficult to fill. Many of these jobs could be filled with qualified graduates of junior colleges.

In some industries it may be desirable to hire technicians to handle routine work under the supervision of professional people. This could be advantageous in that fewer professional people may be needed and therefore could command higher salaries.

Most four year colleges in California have experienced a tremendous growth during the past few years. As more and more students go to the colleges, competition becomes keener. Many students who attempt to do college work fail to complete the four years of training needed. Unfortunately, many of these students drop out of college and are not really trained for an occupation. It was also with this fact in mind that it was deemed desirable to see if a program of two years in college in applied sciences could be worked out to train technicians for certain jobs.

Procedure Used

The study was made under the supervision of G. Allen Sherman, Dean of Agriculture, and Thomas J. O'Connor, Assistant Director of Instruction, and the agricultural faculty including Fred Hagen, Harold Peck, D. Ross Webster, and Herman Weskamp. The college agricultural advisory committee assisted in setting up the study, and the general program was discussed at several meetings. Individual committee members also met in subcommittee meetings.

Meetings and personal interviews were held with the United States Department of Agriculture, state, county, and local firms. These included not only department heads, but also the technicians themselves who were performing the various jobs.

The time of the study covered the period from October 15, 1962 to March 15, 1963.

Findings

After contacting employers in the various federal, state, county, and local agencies, it was found that there were over fifty-one different kinds of jobs for which technicians with two years of training could qualify, and over four hundred employees in these various jobs. Due to the fact that the junior college program is new and in many cases unknown to employers, it was difficult to gain adequate

job information in all areas. In many federal agencies, especially, the jobs calling for two years of college were outlined with the traditional four year program in mind. In the United States Department of Agriculture, promotions are run on a merit basis. A junior college graduate may progress up the career ladder on the basis of his skills, abilities, and performance on the job. In some jobs, full professional status may be obtained by passing an equivalency test. Junior college graduates may also continue their education in evening classes while on the job. Most junior college graduates would enter the Federal Career Service on the GS-4 classification. Therefore, even though the job classification may call for four years of college, a two year graduate could still qualify.

In many of the county jobs, there are differences between counties in job qualifications. A job which requires four years of college in one county may be obtained after two years in another county. No attempt was made in this study to gain complete information for all counties. Therefore, the jobs as defined in the study do not apply to all counties in California.

After reviewing the number and types of jobs, it was decided that there was sufficient need to warrant the establishment of an agricultural technician program. A list of typical jobs in agricultural public service for which two year graduates can qualify is included in Appendix A. Due to the wide diversity of these jobs, it would be impossible to set up individual programs for each job. An attempt was made to determine common areas to arrive at a core curriculum which would meet the requirements for as many jobs as possible. The main areas of instruction recommended by the employers in the study were fertilizers, pesticides and insecticides, chemistry, standardization, vertebrate pests, soils, botany, weeds, truck crops, and agronomy. In addition to the regular general education courses such as English, history, and mathematics, the employers stressed human relations. They pointed out that for public service work the scientific training is useless unless the person can get along with other people. In the business area, the employers stressed businss principles and personnel management.

After evaluating the data obtained from the various interviews and other material, it became apparent that some new courses should be added to the curriculum. Most of the present terminal students do not take the traditional courses in botany, zoology, and chemistry. It seemed advisable, therefore, to establish a course in agricultural science to give additional stress to these areas. This course would be taught with the idea of stressing basic scientific principles and their application.

One of the areas in which the largest number of jobs was available was forestry. Forest rangers were interested in such a program and have expressed a willingness to work with the college in establishing a two year program for forestry technicians. A trial group of students have been selected to work during the summer for the forestry department. The work of these students will be evaluated in order to help establish the program in the future. It is anticipated that courses may be established in Wildlife Management, Conservation of Natural Resources, and an introductory forestry course.

In the agricultural inspection area, two new courses are anticipated in addition to the agricultural science course. These are Fruit Crops and Pest Control. Fruit Crops will be covered more from the variety identification viewpoint than from a production viewpoint. The Pest Control course will supplement the present course in entomology and will cover animal and insect pest control.

For some of the technicians, the areas of farm mechanics and surveying were stressed. These courses are already in the curriculum. In the food processing industry, however, the employees should know food processing machinery care and operation. As a result, a new course in agricultural mechanization is being developed. The course will stress the various types of machinery used in food processing rather than on the farm.

After a review of the data gathered in the study, it was decided that three basic technician training programs would be desirable. These programs would be oriented toward animal science, plant

science, and agricultural engineering. Since it is difficult to cover everything that may be desired in agricultural science, business, and general education in two years, the programs are planned to allow as much specialization in depth as possible. It is anticipated that students will do independent study on a project basis. Students will be urged to carry on laboratory projects in their spare time, just as the other students conduct livestock or crop projects.

The possibilities for summer employment of students are good, and some employers have indicated their willingness to cooperate in this area. It is hoped that these summer jobs will not only help provide valuable experience, but also will help stimulate independent study by the students.

The course of study for the three types of technicians is included in Appendix B. The plant science technician program is designed primarily for students who wish to train for agricultural inspection, forestry, turf grass management, plant research, and soil conservation. The animal science technician program is for students who wish to train for livestock or meat inspection, brand inspection, animal research, range conservation, and animal laboratory technician. The agricultural engineering technician program is for those who wish to train for jobs as agricultural mechanics, surveying aids, forestry aids, weights and measures technicians, soil conservation, and food processing.

The three types of technician programs outlined here are not meant to provide an adequate training for all jobs listed in Appendix A. It is anticipated, however, that they could provide a basic background for students who are given further training on the job. No doubt, changes will be made as these curricula are covered, and as other job opportunities present themselves.

During the visits to the various laboratories made by staff members, a list of jobs and equipment was compiled. This was done with the thought in mind that only those items of equipment which would lend themselves to a two year program should be purchased. Instructors in the various courses have made a list of equipment to purchase and have made plans for the incorporation of this equipment into the various laboratory exercises. Students in the technician program should be just as familiar with the use of moisture testers, microscopes, and other laboratory apparatus as the projection major is with sheep shears, dehorners, or show halters.

Fortunately, a new agricultural science building was being planned while this study was being conducted. This made it possible to incorporate many of the items of equipment needed into the new building. The laboratories have been planned with the technician program in mind. It is anticipated that the building will be completed and equipped for the fall semester of 1963.

Summary

Along with the changing nature of the agricultural industry in Southern California, it was found that there were increasing opportunities for employment in related agricultural fields. Decreases in the number of farms had been offset by increases in agricultural related occupations. It semed desirable, therefore, to look into these various related industries to determine the types of jobs available and the training needed. Since the food processing and distribution industries are large and increasing in Southern California it was decided to survey them. These industries employ laboratory technicians and, in addition, utilize many people in inspection services. There are several large processing plants within a short distance of Mt. San Antonio College such as Hunt's Foods, Sunkist, Minute Maid, and California Consumers Corporation. In addition there is a large dairy and meat packing industry. Other public and private agencies, such as the Forest Service, were included in the survey. The traditional forestry major has never included much agriculture, if any, in the first two years. Dur-

ing the survey the college was approached by the turf grass industry. This industry services both private and public golf courses. The industry was interested in obtaining two year graduates trained as turf grass technicians.

The survey revealed that there were over fifty kinds of public and private service positions for which two year graduates could qualify. Although complete data on the number of employees in all of the areas was not obtained, over four hundred persons, plus many more seasonal employees, are currently working in the fifty types of positions mentioned. It was felt by the college that there was sufficient demand to warrant the establishment of a program for agricultural technicians.

The study revealed that the present type of training for farm employment would not be suitable for technician training. Many of the present courses could well be utilized for both groups but new courses were indicated in the technician area. Some of these courses are not new to agriculture but were not being taught at Mt. San Antonio College. Such courses as Wildlife Management, Forestry, Pest Control, and Agrostology would be included in this area.

A course in applied agricultural science was indicated by the survey. Students taking the technician program will need to know the various scientific principles involved in life and physical science and how to apply them. The development of this course, as the core of the technician curriculum, will be a major task. Close liaison will be kept with the various agencies employing technician graduates. This will be done through advisory committees to help build and change curricula.

The curricula that have been developed for plant, animal, and engineering technicians are intended to furnish the student with enough background from which to enter and advance in an occupation. With agricultural technology advancing as rapidly as it is, it seemed unwise to develop individual curricula for each type of technician. Specific courses can be changed to give emphasis to various career training programs.

There are problems that remain to be solved in the initiation of the program. Many employers are not acquainted with the junior college program and still think in terms of the traditional first two years of the four year curriculum.

Much selling needs to be done to open doors for employment for the first graduates. If these graduates can perform on the job they will help sell the program. No doubt many changes will be made in the curriculum for the various technicians as time goes on.

In some jobs, employees must be twenty-one years of age to qualify. Graduates of junior colleges will average around twenty years of age. If this problem seems to cause difficulty, changes should be initiated to lower the age limit.

The type of technician described in this study is not intended to be as fully qualified as a four year graduate. If the shortage of trained college graduates continues, however, it is anticipated that technicians will be needed to work with the professional men and women in the various related agricultural fields.

APPENDIX A

EMPLOYMENT OPPORTUNITIES FOR GRADUATES OF THE JUNIOR COLLEGE

AGENCY	TYPE OF TECHNICIAN	NUMBER EMPLOYED
United States Department of Agriculture	Agricultural Research Technician	5
	Physical Science Technician	6
	Biological Laboratory Aid	6
	Soil Conservation Aid	10
	Surveying Aid	38
	Forestry Aid	52
	Fire Control Aid	150
	Junior Shipping Point Inspector	8 (225 Seasonal)
	Laboratory Technician	5
	Gardener	1
	Agricultural Biological Technician	5
	Livestock Inspector	
	Meat Inspector	
	Poultry Inspector	
	Pest Control Worker	
	Park Ranger	
	Park Naturalist	
	Plant Quarantine Inspector	
	Plant Pest Control Inspector	
	Inspectors Aid (Raisins)	
	Processed Fruit and Vegetable Inspector's Aid	
	Fishing Aid	
	Inspector of Economic Poisons and Fertilizers	
	Seed Inspector	
	Agriculture Standardization Inspector	
	Seed Potato Certification Inspector	
California State Department of Agriculture	Laboratory Technician	5
	Junior Plant Quarantine Inspector	115 (+75 Seasonal)
	Sampler — Grain and Commodities	
	Agricultural Biological Technician	5
	Livestock Inspector	
	Meat Inspector	
	Brand Inspector	
	Investigator — Marketing Enforcement	
	Weights and Measures Technician	9
	Nursery Inspector	
	Rodent and Weed Control Assistant	
	Field Crop Inspector	

AGENCY	TYPE OF TECHNICIAN	NUMBER EMPLOYED
County (Varies for each county in California	County Agricultural Inspector 1. Plant Quarantine 2. Nursery 3. Field and Orchard 4. Standardization 5. Rodent and Pest Animal Control 6. Weed Control 7. Seed Inspector 8. Apiary Inspector	
Local	Turf Grass Technician Quality Control Technician Artificial Insemination Technician Agricultural Sales Technician Agricultural Engineering Technician Agricultural Landscape and Nursery Technician	15 - 25/Year

APPENDIX B

ANIMAL SCIENCE TECHNICIAN

Freshman Year

Fall	Units	Spring	Units
Feeds and Feeding AH51	3	English	3
Swine Production AH54	3	United States History 27	2
Applied Psychology 2	2	Animal Hygiene and Sanitation AH96	2
Soil Science SS50	3	Livestock Judging and Selection AH52	2
Agricultural Mathematics AG91	3	Agronomy CP51	3
Health Education 1	2	Agricultural Mechanization AE63	2
Conference and Project	1	Conference and Project	1
Physical Education	½	Physical Education	½
	17½		15½

Sophomore Year

Fall	Units	Spring	Units
Beef Production AH54	3	Marketing Agricultural Products AB60	3
Livestock Breeding AH94	2	Forage Crops CP52	3
General Entomology AG51	4	Weeds and Poisonous Plants AG51	3
Agricultural Science AG93A	3	Agricultural Science AG93B	3
American Institutions 10	2	Conference and Project	1
Conference and Project	1	Elective	2
Physical Education	½	Physical Education	½
	15½		15½

PLANT SCIENCE TECHNICIAN

Freshman Year

Fall	Units	Spring	Units
Agricultural Mathematics AG91	3	Farm Surveying AE55	3
Soil Science SS50	3	Weeds and Poisonous Plants PS51	3
Truck Crops CP50	3	Agricultural Mechanization AE63	2
Introduction to Agricultural Economics AB50	3	Agronomy CP51	3
Applied Psychology 2	2	Agricultural Sales and Service AB63	3
Health Education 1	2	Plant Science Elective	3
Physical Education	½	Physical Education	½
	16½		17½

Sophomore Year

Fall	Units	Spring	Units
Entomology AG51	4	Speech 1A	3
Plant Pathology PS50	3	Agricultural Science AG93B	3
English	3	American Institutions 10	2
United States History 27	2	Pest Control	2
Agricultural Science AG93A	3	Plant Science Elective	3
Fruit Crops	2	General Education Elective	3
Physical Education	½	Physical Education	½
	17½		16½

AGRICULTURAL ENGINEERING TECHNICIAN

Freshman Year

Fall	Units	Spring	Units
Applied Psychology 2	2	Irrigation and Drainage SS51	3
Ranch Management AG90A	3	Ranch Management AG90B	3
Farm Machinery AE53	2	Agricultural Sales and Service AB63	3
Farm Tractors AE54	2	Agronomy CP51	3
Agricultural Mathematics AG91	3	Agricultural Mechanization AE63	2
Soil Science SS50	3	United States History 27	2
Conference and Project	1	Conference and Project	1
Physical Education	½	Physical Education	½
	16½		17½

Sophomore Year

Fall	Units	Spring	Units
Ranch Management AG90C	3	Weeds and Poisonous Plants PS51	3
Introduction to Agribusiness AB51	3	Ranch Management AG90D	3
Agricultural Mechanics AE50	2	Agricultural Mechanics AE51	2
English	3	Pest Control	2
American Institutions 10	2	Health Education 1	2
Conference and Project	1	Conference and Project	1
Elective	3	Elective	3
Physical Education	½	Physical Education	½
	17½		16½